

# Mobile Satellite Regulation in the United States

Lon C. Levin, Walter H. Sonnenfeldt  
Gurman, Kurtis, Blask & Freedman Chartered  
1400 16th Street, N.W., Suite 500  
Washington, D.C. 20036 USA  
Phone: 202-328-8200  
FAX: 202-462-1784

## ABSTRACT

During the last decade, the U.S. Federal Communications Commission ("FCC") has developed the regulatory structure for the provision of mobile services via satellite. In May 1989, the FCC awarded American Mobile Satellite Corporation ("AMSC") a license to provide the full range of domestic mobile satellite services in the United States. At that time, the FCC reaffirmed the U.S. mobile satellite industry structure and spectrum allocations that had been adopted previously. Also in May 1989, the FCC authorized the Communications Satellite Corporation ("COMSAT"), the U.S. Signatory to Inmarsat, to provide international aeronautical satellite service via the Inmarsat system. Earlier in 1989, the FCC permitted the use of Ku-band satellites to provide messaging and tracking services. In the mid 80's, the FCC established the Radiodetermination Satellite Service and awarded licenses. Among the mobile satellite matters currently facing the FCC are whether additional spectrum should be allocated for domestic "generic" mobile satellite services, the regulatory structure for the provision of mobile satellite service on an interim basis before AMSC launches its dedicated satellites, and whether to authorize a low-earth orbit

satellite system to provide mobile data service.

## INTRODUCTION

The past decade has seen an explosion in the use of mobile communications. New and improved technologies have led to rapid growth in paging, cellular telephone, and private mobile radio services. Additional new technologies are continually being proposed. One of the most promising means by which to provide mobile communications is through the use of satellites. Recognizing the potential of satellite technology, the FCC has devoted considerable resources toward the development of a regulatory structure to assure the efficient and effective introduction of mobile satellite services in the U.S. This paper provides an overview of the current status of mobile satellite regulation in the United States.

## U.S. DOMESTIC MOBILE SATELLITE SERVICE

In May 1989, culminating a proceeding that began with a Petition for Rulemaking filed by the National Aeronautics and Space Administration ("NASA") in November 1982, the FCC authorized AMSC to construct, launch, and operate the U.S. domestic mobile satellite system consisting of

three satellites using L-band frequencies for mobile links and Ku-band frequencies for feeder links. The first satellite is scheduled to be launched in 1993. The orbital locations assigned to AMSC are 101° W.L. for the central satellite, 62° W.L. for the eastern satellite, and 139° W.L. for the western satellite. At the same time, the FCC reaffirmed its domestic L-band mobile satellite allocations and industry structure regulations. These orders are currently under review before the U.S. Court of Appeals for the District of Columbia Circuit.

#### **Mobile Satellite Spectrum Allocations**

The FCC allocated 28 MHz of L-band spectrum in the bands 1545.0-1559.0 and 1646.5-1660.5 MHz for use by the U.S. mobile satellite service system. Rather than adopting a rigid spectrum segmentation plan, the Commission devised an allocation structure that permits all mobile satellite services to be provided across 27 MHz of the allocation, while assuring that aeronautical safety ("AMSS(R)") traffic can enjoy additional protection relative to other services. Due to sharing constraints with Radio Astronomy, the remaining 1 MHz is limited to aviation safety and certain one-way services.

The U.S. allocation combines all non-AMSS(R) mobile satellite services (land, maritime, and non-safety related aeronautical communications) under the designation 'MSS'. Eighteen MHz of the allocation (two 9 MHz segments at 1549.5-1558.5 MHz and 1651.0-1660.0 MHz) are shared between MSS and AMSS(R) on a co-primary basis, with a footnote providing for priority of AMSS(R) over MSS. In 9 MHz (two 4.5 MHz

segments at 1545.0-1549.5 MHz and 1646.5-1651.0 MHz), MSS is secondary to AMSS(R). With regard to the remaining 1 MHz, one 0.5 MHz segment is allocated to AMSS(R) on a primary basis (1558.5-1559.0 MHz) and one 0.5 MHz segment is allocated to AMSS(R) and Radio Astronomy on a co-primary basis (1660.0-1660.5 MHz). The 0.5 MHz not used by Radio Astronomy may be used by AMSC for one-way dispatch MSS on a non-interference basis relative to all other users of that band. The entire 1 MHz may be used for AMSS(R) communications provided that Radio Astronomy does not suffer harmful interference.

The U.S. domestic allocation is consistent with international allocations. In pertinent part, both allocations provide the same status for AMSS(R) and land mobile satellite service.

The Commission allocated 200 MHz of Ku-band for feeder link use to each of the three satellites. The central satellite at 101° W.L. is allocated 200 MHz of the 11/13 GHz band. The satellites located at 62° W.L. and 139° W.L. are allocated 200 MHz of the 12/14 GHz band.

**MSS Expansion Band Rulemaking.** In February 1990, the Commission adopted a Notice of Proposed Rulemaking proposing to reallocate the bands 1530.0-1544.0 MHz and 1626.5-1645.5 MHz for domestic generic mobile satellite services. These bands are currently allocated to the maritime mobile satellite service. The Commission proposes that maritime safety services be afforded real time preemptive priority in the MSS expansion band. Applications seeking permanent authority to use these bands for domestic service

are being held in abeyance pending completion of the rulemaking.

### **MSS Industry Structure**

Due to technical and economic considerations, the FCC decided to license one system (AMSC) at this time to provide the full range of land, maritime, and aeronautical services. The license is based on the FCC's finding that a single satellite system providing all services is currently the best means by which to "ensure efficient use of spectrum, promote safety, and introduce new services to the public in a timely manner." In particular, the FCC concluded that the efficiencies inherent in a single system will help assure that aviation safety services will be made available soon. Accordingly, the FCC authorized AMSC to be the MSS and AMSS(R) licensee.

AMSC will provide space segment on a common carrier basis. AMSC will operate as a carrier's carrier, providing open access to carriers and end users. AMSC's ground segment will be authorized separately. Earth stations accessing the system will be licensed individually. Mobile units will be authorized under blanket licenses, with the exception of aeronautical mobile earth terminals, which may be licensed individually.

### **Services & Coverage Area**

AMSC is licensed to provide the full range of land, maritime and aeronautical services including two-way voice, two-way voice dispatch, two-way mobile data, air traffic control, airline operational and management communications, and aeronautical passenger correspondence. Fixed and transportable services may be

provided on a non-interference basis to segments of the population where few alternatives exist. AMSC is required to provide coverage of the entire U.S. domestic market including all 50 states, Puerto Rico, the Virgin Islands, and U.S. coastal areas up to 200 miles offshore, except for those waters that are part of the territory of another country. In recognition of the relationship between the AMSC and Telesat Mobile, Inc., systems for mutual back-up and restoration capability, the FCC authorized AMSC to construct its satellites to cover Canada. AMSC may also construct its satellites to cover Mexico. Authority to operate in Canada and Mexico must be obtained by separate application.

**Aeronautical Matters.** By its authorization, AMSC is required to accord priority and real-time preemptive access to AMSS(R) communications throughout the entire assigned bandwidth. AMSC also must develop arrangements to "hand-off" aeronautical traffic to other MSS systems, such as the Canadian and Inmarsat systems.

Additionally, the FCC expects that aeronautical feeder link stations and mobile terminals will have certain unique characteristics to meet aviation safety operational requirements. The FCC may require special licensing procedures or application requirements for these facilities. All mobile terminals to be used on aircraft, including those for non-AMSS(R) communications, must be type accepted and licensed under the FCC's Rules governing aviation communications. The FCC expects the Federal Aviation Administration ("FAA"), which is the U.S. entity responsible for aviation safety, to be involved

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directly in the development of standards and practices in order to assure that aviation safety satellite services will be of the highest integrity.

#### **Interim Service**

The FCC is currently considering the regulatory structure under which interim mobile satellite service can be provided in the U.S. until AMSC dedicated facilities are in operation. AMSC and others have proposed the use of Inmarsat space segment for the interim period. Inmarsat space segment is attractive because it operates on spectrum adjacent to the spectrum assigned to AMSC, thereby enabling users to transition smoothly from the Inmarsat system to the AMSC system.

#### **USE OF INMARSAT IN THE UNITED STATES**

Also in May 1989, the FCC established policies for the provision of international aeronautical services in the U.S. via the Inmarsat system. The Commission determined that COMSAT, the U.S. Signatory to Inmarsat, will be the sole U.S. provider of Inmarsat space segment for aeronautical services. In addition, the FCC decided that aeronautical services provided via Inmarsat to aircraft over the U.S., its territories, and adjacent coastal ocean areas could be offered on a permanent basis only to aircraft in international flight. The FCC defines international flights as those between the U.S. and foreign points (and vice versa), and those flying over the U.S. between two foreign points. COMSAT and AMSC are required to develop hand-off procedures for transferring aeronautical traffic between the

Inmarsat and AMSC systems. The FCC has received two filings requesting reconsideration of the geographical scope of Inmarsat service in the U.S.

#### **OTHER SATELLITE-BASED MOBILE SERVICES**

The FCC has licensed other satellite-based mobile communications service providers. In February 1989, Qualcomm, Inc., was authorized to operate mobile terminals to provide messaging and tracking services using existing fixed satellite service space segment at Ku-band. In August 1986, Geostar Corporation was authorized to construct, launch and operate a dedicated Radiodetermination Satellite Service ("RDSS") system. Geostar has also obtained authority to provide interim RDSS service until its dedicated RDSS satellites become fully operational.

Orbital Communications Corporation ("Orbcomm") has filed a Petition for Rulemaking seeking to establish an allocation in the VHF/UHF bands for a low speed mobile data and tracking service using low-earth orbit satellites. Orbcomm has also filed an application to construct, launch, and operate a twenty satellite low-earth orbit system in the proposed allocation. The FCC has invited public comment on these filings.

#### **REFERENCES**

1. **AMSC Authorization Order**, 4 FCC Rcd 6041 (1989).
2. **Spectrum Allocation Reconsideration Order**, 4 FCC Rcd 6016 (1989).
3. **MSS Structure Reconsideration Order**, 4 FCC Rcd 6029 (1989).

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4. **MSS Expansion Band Notice of Proposed Rulemaking, General Docket No. 90-56, FCC 90-63 (released March 5, 1990).**
  5. **Inmarsat International Aeronautical Services Order, 4 FCC Rcd 6072 (1989).**
  6. **Qualcomm Authorization Order, 4 FCC Rcd 1543 (1989).**
  7. **RDSS Allocation Order, 50 Fed. Reg. 39101 (September 27, 1985).**
  8. **RDSS Structure Order, 104 FCC 2d 650 (1986).**
  9. **Geostar Space Segment Authorization Order, 60 RR 2d 1725 (1986); FCC Mimeo 6144 (1986).**